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Copyright

3 Waves: The Art and Practice of Mixing Sound

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For everyone that taught me how to listen.
-<3 SiG

PERSPECTIVES & PRACTICES

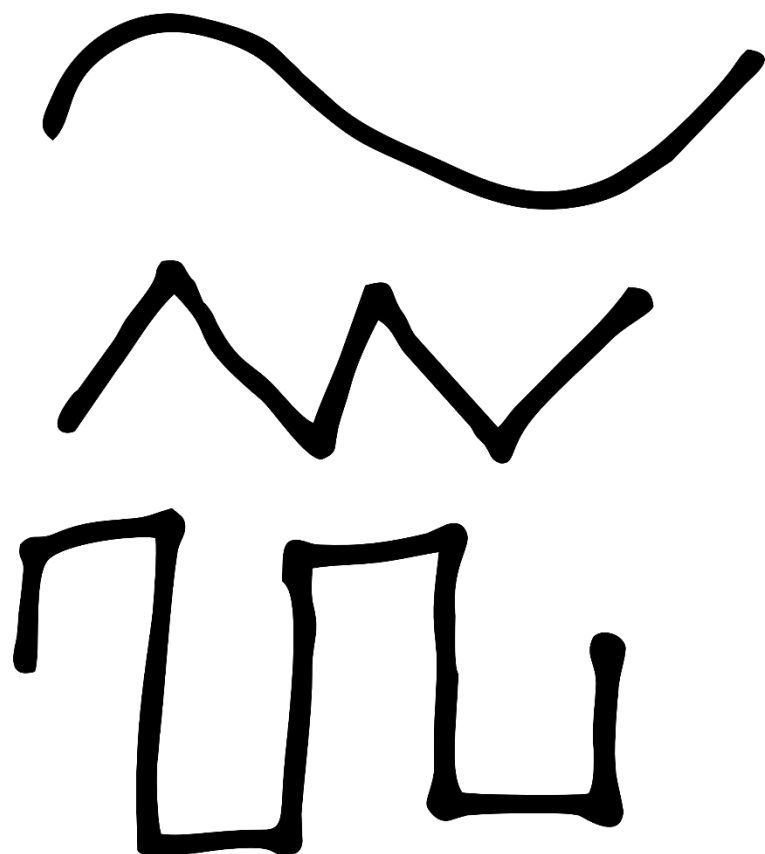


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PHILOSOPHY



I.

Listen.

II.

Use your ears, NOT your eyes.

You are using science and complex math to create art. It's like if Gandalf and Spock had a child.

Perfection is unattainable.

There is no wrong and there is no right. BUT, when it's wrong, it's wrong. And, when it's right, it's right.

LESS IS MORE.

If you're doing too much, something is wrong.

III.

Mixing is a skill. You practice a skill. You don't buy a skill.

There is no rule or technique in mixing that applies 100% of the time.

Learn the rules, then break them.

Mix dramatically. The cleanest, safest bet is often the most boring.

Follow your instinct. Don't overthink yourself out of a good mix.

If you can't fix it, create a beautiful fuck up (or delete it).

IV.

Serve the song. Understand what the musical idea is emoting and emphasize it.

Find the core element that drives the song and accentuate it.

A technically "incorrect"/"bad" mix might better serve the song than a "correct" mix. Example: "Look At Me" by Xxxtentacion.

V.

Don't be afraid to add your take on the song's arrangement into the mix. Some clients even expect this of you.

Start with good sounds. It'll make mixing a lot simpler (if you have any input in the creation process of the song).

VI.

- Walk away. Regain perspective.
- Listen in multiple moods and emotional states.
- Making revisions to a mix is like chewing gum; if you chew it too long eventually the flavor is gone.

Consumer taste, with regard to mixing, goes through fads, just like how genres of music rise and fall in popularity. An industry standard mix for the early 2000's may not be adequate in the 2010's. Make sure you're aware of how mixing is sonically evolving.

SELF CARE



I.

Working from a place of frustration is generally not productive. Walk away.

Take breaks.

II.

DO NOT MIX WITH THE VOLUME ALL THE WAY UP.

Protect your ears even when you're not mixing or listening to music.

Your ears get tired like any other muscle in your body. Give them rest and recovery.

Your eyes will get tired just like your ears. We stare at computer screens extensively as engineers.

Find a good E.N.T. (Ear, Nose and Throat Doctor).

III.

Drugs affect your auditory perception.

Do with that information what you will.

ENVIRONMENT



I.

A bad mixing environment leads to bad decisions.

A good mix sounds good in any environment.

Consistent practice mixing in the same environment is crucial. This helps you maintain perspective on the mix itself without the influence of a different listening environment.

II.

If a familiar and/or quality physical space with quality speakers is unavailable, a good pair of headphones is often the best alternative.

\$500 headphones are better than \$5,000 speakers in an untreated boxy room.

Knowing your gear is better than using fancy new and expensive gear you know nothing about.

III.

When mixing in a new environment / with new equipment, be sure to first playback a reference track in that environment.

You should be familiar with how the selected reference track is “supposed” to sound. How it translates in the new environment will help inform your mixing decisions.

THE CLIENT



I.

What the client/artist wants it to sound like trumps what you think it should sound like. Period.

The client is never wrong, even when they're wrong. Mixing is a service industry.

Your client is (likely) not an audio engineer. They don't care why it sounds the way it does. They care about how it sounds. Period.

II.

Some clients are more trouble than they are worth. Learn how to turn away work.

Learn how to recognize a problematic client early on in the business relationship.

Red flags include: uncomfortability when discussing payment, vague desires and/or unreasonable requests of you as the mixer.

Clients who rely on mixing to "fix" poorly recorded audio and performances consume a lot of your time and energy.

III.

Sometimes you aren't the right engineer for the job. This doesn't mean you're a bad engineer; you just aren't the one for this particular mix.

Know when to say "no" to a potential client. Know when to quit if it isn't working out.

As you build a relationship with a client, learn what they like sonically. It doesn't always align with what you like.

Provide the mix they want, not the one you want.

IV.

It's often (but not always) advisable to familiarize yourself with the client's previously released music.

This way, you can have an idea of how they like to sound before beginning your mix.

Conversely:

Once you have established yourself as an engineer, you have a known and branded sound (whether you know it or not).

Your sound is why the client chose to you (hopefully). Don't emulate their old material with your mix unless expressly asked to do so.

V.

Don't beat yourself up too much if a client doesn't like your mix.

You are shooting at a moving target based on fluctuating emotional reactions that can vary by the hour, if not minute.

A client's opinion of your mix is not objective, just as yours isn't.

TECHNIQUE



TITLE PAGE



PREPARATION



I.

Proper prior preparation prevents creative fatigue and minimizes distractions from mixing.

Efficiency is key.

II.

Make sure the stems/trackouts are sent to you appropriately **BEFORE** mixing.

Ensure there is even audio to be heard in the audio files (this is not a joke).

Request “dry” (minimal printed fx on the tracks) AND “wet” versions of the trackouts/stems from your clients.

Request that they send “.wav” files with a sample rate of at least 44.1kHz and a bit depth of at least 24 bits.

III.

Once you’ve loaded in the audio files for mixing, save a copy of the session raw.

You can always revert back to the original if you're unhappy with your results.

There are certain techniques and plug-ins you will use every time you start a mix.

Save time. Build a template within your DAW with the basics already set-up.

Save audio effect parameters and plug-in chains that you find yourself constantly using as presets.

IV.

Assess your process and develop a routine.

Make templates wherever possible.

Automate what can be automated.

LEVELING



I.

Google the “Fletcher Munson Curves”.

II.

Balancing volume levels between sounds is the most important step of mixing. It guides the listener’s focus.

A good mix can be turned up in volume (in mastering or by the listener).

A shitty mix will make your ears bleed if it’s turned up.

That being said, everything makes your ears bleed if it’s too loud (120db or more).

III.

Sometimes to turn a sound up, turn the other sounds down.

Some sounds are meant to be felt and not explicitly heard.

Vocals, drums and bass are usually the loudest elements in your mix (for most popular music).

IV.

Don't rely on limiters to fix bad leveling.

Don't rely on mastering to fix bad leveling.

EQUALIZATION: SHAPING FREQUENCIES



I.

EQ = Equalization

You are manipulating the frequency response (loudness) of specific frequency ranges.

II.

Two schools of thought:

Additive Equalization: boost what's good.

Subtractive Equalization: cut what's bad.

Scientifically, there is no difference. Do what makes sense to your brain.

III.

Equalization can be for “cleaning up” sounds.

Often "cleaning" sounds is subtractive in nature.

This type of equalization is best done at the source.

Examples of what may need removal: Low end rumble, high-end whistles etc.

Amplified instruments often need “cleaning”.

EQ can also be used to creatively shape a sound. For example, equalization can make a sound seem as though it is being played through a telephone.

To make something sound far away, try removing some of the high and low frequency content and then adding reverb to taste.

Equalization of a sound source can drastically alter the source’s perceived volume.

IV.

It allows you to manipulate the direct and off-axis frequency response of a sound source separately.

It is a great tool for carving out space in the center of your mix without completely sacrificing those frequencies in the total stereo spectrum.

Frequency analyzers visual display a sound source's frequency response.

They can help you identify overly-emphasized frequencies.

Some EQ's have these built into the GUI.

Pitches have a numeric value in hertz. By accentuating these values with EQ you can accentuate the pitches that are in the key of a song, even on instruments that are “not tuned to pitch” (like kick drums).

COMPRESSION, LIMITING AND DYNAMICS



I.

Compression controls dynamic range. It evens out the perceived difference in loudness between a signal's loudest peak and quietest valley.

Imagine the difference in volume between a whisper and a yell. Turn the whisper up and the yell down (to taste).

II.

Compression is (generally) used to raise the perceived loudness of a signal.

Compression will change the frequency response of a sound. EQ appropriately.

Over-compression (squashing it), can suck the soul out of a track.

III.

Limiters are like compressors on steroids.

Using multiple limiters in sequence with less extreme parameter settings is often more effective at raising the overall volume of a mix/track while maintaining clarity than using a single limiter with extreme parameter settings.

IV.

Ear-training:

Classical music uses very little compression (generally speaking) to maximize dynamic range.

Pop music compresses the shit out of everything, ESPECIALLY EDM.

Listen and learn the difference.

V.

Google sidechain compression.

Google parallel compression.

You're welcome.

CREATING SPACE: PANNING



I.

You are essentially determining the directionality of a sound source.

II.

In stereo, panning is described as LCR: Left, Center, Right.

Every instrument does not need to go in the center. Panning exists for a reason.

Panning is often thought of from two perspectives:

“The Audience’s” perspective: you’re listening to the song from the crowd. Imagine where the band members are standing on stage and pan accordingly.

“The Band’s” perspective: invert the concept of the audience perspective.

III.

Google “phase cancellation”.

Pan too much and too wide and you can create a lack of energetic focus in your mix.

Don't pan at all and your mix will sound like an overwhelming mess that lacks depth, clarity, or a sense of environment.

Using “doubblers” and tools that “widen” a source's stereo image can add space and tame overwhelming build-up and harshness that multiple directly-centered sources can create.

Bass heavy sounds are usually panned to the center.

Also, you should ensure your sub bass frequencies are in mono, generally speaking.

IV.

Headphones display pan positions with hyper accuracy. Speakers and sources that interact with live acoustic environments do not.

This is why records from the 1950's with the entire drum set panned all the way to the left sound annoying af on headphones but not on your boutique, tube-amped, stereo system.

Most people don't listen to music (or anything) in surround sound. So, it's not necessary to mix for surround sound or Dolby atmos 99.99% of the time.

CREATING SPACE: REVERB AND DELAY



I.

These are very easy to overdo.

This often makes or breaks a mix.

Without reverberation and echoes, your mix exists in a vacuum of artificiality.

II.

EQ your reverb. EQ your delay. Period.

III.

Reverbs and delays are often best used as part of auxiliary sends/bus tracks.

In this way, you can send multiple sounds/instruments to the same reverb.

This helps create uniformity of space amongst the different sounds.

It also cuts down on CPU usage.

Automate the amount of reverb and delay being used on specific sounds at specific moments. This is called a reverb or delay “throw”. One of the easiest ways to make a mix sound "pro af".

PROCESSING, PLUG-INS AND AUDIO EDITING



I.

Plug-ins to an engineer are akin to tools for a handyman; if you don't know how to fix it, the hammer is useless.

The order of your plug-ins / processing matters, A LOT!

II.

FX processing is magical but only if your basic signal processing (EQ, compression, etc.) is done well.

Sometimes, replacing a sound is simpler and more effective than trying to fix a sound with processing.

III.

Mixing and audio editing is NOT the same thing.

Mixing is transforming a group of tracks into a balanced, blended and ideal form to be perceived as a singular final piece of music. You are beating the raw ingredients into pancake batter.

Editing is a laborious process of removing breaths and tuning vocals etc. If a client expects you to do both, charge for both. You are checking the expiration dates on the ingredients before pouring them in your proverbial mixing bowl.

SIGNAL ROUTING: RETURNS, BUSSES, SENDS



I.

Sends and Auxiliary Return tracks are virtually the same thing.

They divert a portion of the direct audio signal from a given track(s) to an alternative processing channel before being routed to the master fader.

II.

Busses route the entirety of an audio signal from a given track(s) to an alternative processing channel (or “Bus”) before being routed to the master fader.

III.

Use “busses”/“sends”/“aux (auxiliary)” tracks to save on CPU usage.

They will also minimize redundancy when processing multiple signals the same way.

AUTOMATION



I.

Automation is not always necessary but can humanize the mix by adding unique and special variations to particular track elements.

II.

Save automation for last (usually).

Why? Automation is the biggest pain in the ass to work around if revisions need to be made to a mix.

METERING



I.

The feel of a record always trumps whatever the meters say.

Meters are good for double checking your sanity when you've lost perspective.

DIGITAL VS. ANALOG



I.

This is way overblown in the audio community.

II.

It is possible to clip digitally without creating audible distortion.

Digital emulations of “analog” gear are usually just adding white noise to your track. Use them sparingly.

INSTRUMENTATIO

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VOCALS



I.

Listen to people sing/talk in real life.

How your ears hear voices and how microphones hear voices are two very different things.

Recording voices with microphones is like zooming in on your wrinkles and pores with a telescopic lens.

Usually the focal point of a mix (unless it's an instrumental solo).

II.

“Ssss’s” sssound like ssshit. Find them in a vocal, usually between 3-6kHz, and use EQ’s and De-esser’s to tame them.

“P’s”, “B’s” and other “plosive” sounds also sound like shit if not managed.

Too much bass and too much high end in a vocal makes it sound like an ASMR video.

All of these problems are worsened if the vocal is recorded too close to the microphone.

III.

If a record has multiple vocalists on it, it is often best to make these vocalists sound as though they are in a similar space and match their tones, as best as possible.

BASS



I.

It is possible... and hear me out on this one... that your bass is too loud.

Controlled and focused bass response is one of the hallmarks of a great mix.

II.

(In popular music) if it's not a bass part or kick drum, anything below 100hz is in the way.

Anything below approximately 100 hertz should be in mono (with few exceptions).

III.

Subs and other low frequency sounds are the biggest enemy of headroom (clarity) in a mix.

Saturating your bass sounds in the low-mid frequency range can really help with pitch clarity and perceived loudness.

DRUMS AND PERCUSSION



I.

More than any other sound, how drum and percussion tracks are mixed defines the emotionality and often the genre of a track.

II.

The quick transient nature of percussive elements define the dynamic range in today's popular music.

III.

I'd rather have my drums hit too hard than not hit hard enough. Except for cymbals. Cymbals can definitely be too loud.

OTHER



I.

The fact that all other instruments fit into this category of the book(let) should tell you everything you need to know about mixing them.

They're less important than the vocal, bass and percussive elements.

II.

Find what makes them unique and amplify that without getting in the way of the vocal, bass and percussive elements.

THE 'FINAL' MIX



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WHEN YOU'RE DONE (OR THINK YOU ARE)



I.

When you think you're done, export it and step away.

Rest your ears and brain.

Listen again in a different context, once your brain has reset from “engineer mode”.

Listen to your mix next to reference tracks.

II.

Check your mix in multiple listening environments, especially ones consumers use (earbuds, the car, laptops, phones).

Listen to your mix in mono to identify possible phase issues.

III.

Ask yourself: who am I sending the mix to?

If you're sending it directly to the client make sure the average loudness of the mix is equatable to most commercially released tracks.

If you're sending it to be distributed make sure the average loudness of the mix is equatable to most commercially released tracks.

If you're sending it to a mastering engineer, leave headroom for mastering.

DO NOT SEND A SQUASHED MIX TO A MASTERING ENGINEER.

MIXING IS NOT MASTERING



I.

There is a difference between mixing and mastering.

Make sure you know this.

Make sure your client knows this.

Mastering is added to the stereo file of the final mix.

Masters are louder, stickier and more polished.

II.

Your mix won't be as loud as a commercially released master recording. That's what mastering is for.

You can mix into a processing chain on your master audio track to get an idea of what your mix will sound like when mastered.

AFTERWORD



Do what feels right.

ABOUT THE AUTHOR



Siegfried has over a decade of experience within the music industry. His credits include: BET, VH1, Motown Records, Sony Music, Atlantic Records, and Universal Music Group. He holds a Bachelor's degree in Music Business from the Hayes School of Music. He is renowned for his meticulous attention to detail and genre-bending audio production.

Currently, Siegfried has stepped away from audio engineering and now privately contracts as a creative director for music labels, artists and various other brands. He also hosts workshops and participates in mentorship programs.

When not immersed in music, he enjoys avocado toast, composting and abstract photography. Currently based in the Virginia countryside, Siegfried and his life partner can be seen walking their two Irish wolfhounds across the moors at night, finding solace in the eerie beauty of the landscape.